SCOPE AND OBJECT OF THE WORK

Amphiphilic molecules, or amphiphiles, not only are highly interesting from physicochemical view point but also fundamental to life and living bodies. It is not exaggeration to say that all living things are made up of colloids comprising a wide variety of amphiphiles[1]. Of these amphiphiles, the surface active substances are also called surfactants, showing strong action on surfaces and interfaces to change their properties profoundly. Surfaces and interfaces are, of course, present everywhere in our daily life and in many kind of industries; so surfactants can be used in application field of every short[2].

Colloidal and interfacial phenomena play a significant role in many aspect of our modern society. On the one hand colloidal systems are extensively used in the application of detergents, cosmetics, paints and coatings, lubricants, food and pharmaceutical products, foaming agents, wetting agents etc., in solving the day-to-day problems that exist in many field of industrial and domestic processing. On the other hand, these phenomena are also critical to the very fundamental processes of biological membrane formation and functions in living cells[3]. The nature of colloidal and interfacial science is: (i) to explore the ability of amphiphilic materials to form molecular self-aggregations with the principal goal of advancing knowledge in the field of fundamental studies; (ii) to search for the best surfactants or combination of surfactants for use in new applications in the field of applied research[4]. The study of colloidal and interfacial science is one of a few areas in chemistry that has exhibited this dichotomy of purpose. Since the process of surfactant adsorption at the surface/interface is closely related to the stability of the self-aggregate in the bulk phase[5], and since by far the largest number of surfactant applications are in aqueous media, the study of self-aggregation in aqueous solution has traditionally been the principal focus of colloidal and interface science[6].

There has been a renewed interest in behavior of surfactants in solution in the last three decades. One of the main reasons for this renaissance is that a variety of new techniques like neutron scattering, quasielastic light scattering, rheology, luminescence probing, NMR, spin-labeling, etc. which are particularly suitable for studying surfactants in solution has become available on a routine basis in research laboratories[6]. The second

reason is the development of theories to treat the kinetics of micellization which have provided a better understanding of the dynamics of micelle formation, breakdown and organization of the interior of surfactant aggregates[7-13]. Thirdly, the rejuvenation of the thermodynamic methods through technical improvements and theoretical developments has enabled one to extract better information about surfactant solutions from quantitative analysis of experimental results[14-26]. The last and the most important reason is the increasing use of surfactants in every industry sector, especially in applications to enhance crude-oil recovery[27].

The majority of fundamental studies on solution behavior of anionic surfactants has been made on sodium dodecylsulfate. Surface chemical studies of lithium dodecylsulfate are very limited and hence its surface chemical applications are scarcely found in literature. Its hydrated bulky hydrophilic groups in aqueous solution are expected to play a special role in their solution and interfacial behaviors. How this surfactant behaves individually in solution as well as in binary and ternary mixtures requires a serious attention of research.

Although vast majority of investigations of various single surfactants as well as their mixtures have been made in aqueous medium, relatively few such studies are available in pure nonaqueous solvents[28-51]. The situation is really worsened in the aqueous mixtures of organic solvents.

The objective of the present work is, therefore, to elucidate different micellar properties of some simple amphiphiles including lithium dodecylsulfate and also their mixtures in aqueous and non-aqueous media from conductometric, volumetric, interferrometric, tensiometric and spectrophotometric measurements. The available data have been utilized to examine the different physicochemical properties of these amphiphilic substances in both aqueous and non-aqueous solutions using various existing theories of micellization.

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